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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/863,872	05/24/2001	Stefan Boneberg	1748X/49969	9481

23911 7590 07/13/2005  
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EXAMINER

DUONG, THANH P

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/863,872

Applicant(s)

BONEBERG ET AL.

Examiner

Tom P. Duong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-12 is/are rejected.
- 7) ☒ Claim(s) 2 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

Applicants' remarks and amendments filed on April 4, 2005 have been carefully considered. Claim 1 has been amended. Claims 1-13 are now pending in this application.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1 and 3-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benz et al. (6,187,066) in view of European Patent Application EP 0968958A1 (EP '958). Regarding claims 1 and 12, Benz et al. discloses a method for operating a gas generation device (Col. 1, lines 1-15 and Col. 2, lines 53-56) for a fuel cell system (Col. 2-Col. 4) having at least two gas generation units (2,3) which a starting-material stream flows in sequence (See Figs. 1-2) , and which have a first (Col. 3, lines 49-50) and second rated power (Col. 3, lines 52-53) and a first and second predetermined operating temperature (Col. 3, lines 58-67), respectively, said method comprising: providing the first gas generation unit (3) with a lower thermal mass (Col. 3, lines 49-50) than the second gas generation unit (Col. 3, lines 12-13); during a starting phase (cold

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start) of the gas generation device, operating only the first gas generation unit (Col. 3, lines 49-53), with power  $P_{start\_1} > P_{rated\_1}$  (Col. 3, lines 49-53) or at an operating temperature  $T_{start\_1} > T_{start\_2}$  (Col. 3, lines 58-67 and Col. 4, lines 1-5); and after the end of the starting phase, operating at least the second gas generation unit (Col. 4, lines 1-5). With respect to the first gas generation unit with  $P_{start\_1} > P_{rated\_1}$ , Benz discloses during the warmed-up operation or normal operation (Col. 4, lines 1-4), no fuel/air mixture is conducted thru first gas generation unit (3). Thus, the first gas generation unit (3) inherently has  $P_{rated\_1}$  at normal operation less than  $P_{start\_1}$  at cold start-up. Note, Applicants has not clearly defined what  $P_{rated\_1}$  or "rated power". Herein, it is best understood to be the  $P_{rated\_1}$  is the operating power above normal operating power but below the maximum design power for the unit. With respect to the thermal mass, applicant has not clearly defined what parameter(s) created a low thermal mass in the first gas generation unit. Herein, the terminology "thermal mass" is generally defined as the mass (mass of gas stream) times heat capacity (heat capacity of the gas generation unit). Benz '066 discloses a "reduced" quantity of fuel/air mixture is conducted through first gas generation unit (cold start component 3) at a cold start to provide a quick start-up (Col. 3, lines 49-53). For purpose of argument, the gas generation units 2 and 3 of Benz have the same heat capacity. Based on the above definition of a thermal mass, a "reduced" fuel/air mixture thru the gas generation (3) of Benz inherently provides the first gas generation unit (3) with a lower thermal mass than the second gas generation unit (2). Alternatively, EP '958 teaches it is desirable to provide a reformer with upstream catalyst unit with a lower heat capacity than the

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downstream catalyst unit (Section 0048) to avoid excessive heating of the reformer and allow the unit to be heated and brought up quickly to operational temperature (Sections 0048-0049). Thus, it would have been obvious in view of EP '958 to one having ordinary skill in the art to modify the gas generation device of Benz with a lower heat capacity in the first gas generation unit as taught by EP '958 in order to facilitate safe and fast start-up during cold start-up. Regarding claim 3, Benz discloses the gas generation units are indirectly heated for endothermic steam reforming (Col. 2, lines 33-36); the first gas generation unit is operated during the starting phase at a temperature  $T_{start\_1} > T_{rated\_1}$  and is supplied with at most a quantity of operating medium which corresponds to an instantaneously required power (Col. 2, lines 60-62); and after the end of the starting phase, the gas generation units are operated at predetermined operating temperatures (Col. 3, lines 60-67). Regarding claim 4, Benz discloses the starting phase, at least the first gas generation unit, is also supplied with an oxygen-containing medium in addition to the operating medium (Col. 3, lines 49-50); at least the first gas generation unit is suitable for partial oxidation or for autothermal operation (Col. 3, lines 1-3 and Col. 5, lines 44-47); and during the starting phase at most a quantity of operating medium or quantity oxygen-containing medium which corresponds to the power  $P_{start\_1}$  is supplied (Col. 3, lines 35-37). Regarding claim 5, Benz discloses after the end of the starting phase, the first gas generation unit is supplied with only a quantity of oxygen-containing medium which is reduced compared the maximum quantity reached during the starting phase (Col. 5, lines 16-21). Regarding claim 6, Benz discloses no oxygen-containing medium is supplied (Col. 4, lines 1-2). Regarding

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claims 7-9, Benz discloses the describes the method wherein after the starting phase has ended, in the event of a low and medium load only the second gas generation unit is operated (Col. 4, lines 1-5 and Col. 5, lines 12-13). Benz fails to disclose expressly the first gas generation unit is operated only when a required power exceeds the rated power  $P_{rated\_2}$  of the second gas generation unit is required, and the oxygen-containing medium is supplied to the first gas generation when a required power exceeds the rated power  $P_{rated\_2}$  of the second gas generation unit. However, Benz discloses that most of the conversion process takes place in the central component 2 (second gas generation) and the remaining conversion takes place in the component 3 (first gas generation) during a hot operation (Col. 5, lines 13-21). Note, the feedback control device 12 (Figures 1-2) provides the benefits for controlling the operating reaction and temperature in both the central component 2 (second gas generation unit) and the cold-start component 3 (the first gas generation unit). Thus, it is obvious that the cold-start component 3 (first gas generation) provides some and/or additional conversion of the fuel/air in the event the central component 2 (second gas generation) becomes overheated or overload. Therefore, it would have been obvious in view of Benz to one having ordinary skill in the art to provide such controlling safety feature where the cold-start component 3 operates or handles a portion of the conversion process when the central component 2 (second gas generation) becomes overheated or overloaded ( $P_{operate\_2} > P_{rated\_2}$ ). Regarding claim 10, Benz discloses means (electrical heating device) for keeping the first gas generation unit warm (Col. 2, lines 60-63 and Col. 6, lines 51-54). Regarding claim 11, Benz discloses the starting

phase has ended as soon as the components of the fuel cell system through which the product gas stream of the first gas generation unit flows have reached a predetermined operating temperature (Col. 4, lines 1-5).

### ***Allowable Subject Matter***

Claims 2 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art fail to disclose or suggest the first gas generation unit is operated only when a required power exceeds the rated power  $Prated\_2$  of the second gas generation unit in combination with the additional features recited therein.

### ***Response to Arguments***

Applicant's arguments filed April 4, 2005 have been fully considered but they are not persuasive. With respect to the Applicants' argument that the system of Benz '066 is a heater not a gas generation unit, Examiner respectfully disagrees. Benz '066 clearly discloses the gas generation system generated hydrogen gas (Col. 1, lines 1-15). With respect to the argument of that neither Benz or EP '958 teaches or suggests the first gas generation unit operated with a power or temperature which exceeds the rated power or temperature of the limit, Examiner respectfully disagrees. Note, Applicants has not clearly defined what  $Prated\_1$  or "rated power". Herein, it is best

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understood to be the  $Prated\_1$  is the operating power above normal operating power but below the maximum design power for the unit. Benz discloses during the warmed-up operation or normal operation (Col. 4, lines 1-4), no fuel/air mixture is conducted thru first gas generation unit (3). Thus, the first gas generation unit (3) inherently has  $Prated\_1$  at normal operation less than  $Pstart\_1$  at cold start-up.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom P. Duong whose telephone number is (571) 272-2794. The examiner can normally be reached on 8:00AM - 4:30PM.

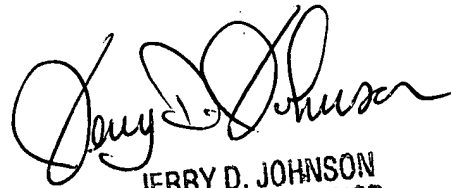


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tom Duong  
June 30, 2005  
TD

(16)

  
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